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RESPONSE TO U.S. EPA COMMENTS ON THE SITE PREPARATION AND MATERIAL REMOVAL PRE-FINAL DESIGN

ENVIRO-CHEM SUPERFUND SITE ZIONSVILLE, INDIANA

Prepared For:

ENVIRONMENTAL CONSERVATION AND CHEMICAL CORPORATION TRUST

Prepared By:

AWD TECHNOLOGIES, INC.
INDIANAPOLIS, INDIANA

AWD PROJECT NUMBER 2259-870

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AWD
TECHNOLOGIES
A Subsidiary of
The Dow Chemical Company

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May 6, 1993

Ms. Karen A. Vendl
Senior Remedial Project Manager
Office of Superfund
United States Environmental Protection Agency - Region V
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Subject: Enviro-Chem Superfund Site
Zionsville, Indiana
Site Preparation and Material Removal
Response to USEPA Comments on the Pre-Final Design

Dear Karen:

Please find enclosed under cover of this letter three copies of the Site Preparation and Material Removal (SPMR) Response to EPA Questions for your review. The SPMR Phase Air Monitoring Plan, and the proposed schedule for execution of the SPMR Phase Execution will be delivered to your office on Monday morning, May 10th.

Please keep in mind that based on the Trustees latest meeting with EPA there are several important changes which not only affect the scope of work to be performed under SPMR, but also address some of EPA's comments. These changes are as follows: The drum consolidation and removal work has been placed under the scope of the Remedial Action Phase; an Air Monitoring Plan (AMP) has been developed specifically for SPMR; and, conversations have taken place with IDEM regarding the classification of certain items as "Special Waste". These are all spelled out in detail in the response to comments.

Due to the fact that a separate AMP has been developed for SPMR, a complete response to the EPA's comments will be provided with the Pre-Final package to be submitted for the Remedial Action Phase. Also, I will include in your set one extra copy of the Pre-Final SPMR AMP for your Air Specialist to review. The rest of the distribution is as before.

The area of the Design Package which received the most attention was the project organization as it pertains to the Quality Assurance Project Plan and other quality control documents. Every effort was made to clean-up several inconsistencies which were present in our previous submittal. Secondarily, great attention was given to reviewing the project plans and specifications for biddability and constructability in light of the EPA comments and the compressed construction and procurement schedule.

AWD Technologies, Inc.
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I look forward to discussing these items with you and/or your staff as necessary. If you have any questions or concerns regarding the SPMR Phase documents, please contact me at (317) 469-0703.

Sincerely,

Bradford K. Grow
Director of Operations - Indianapolis

BKG/aeg

cc: R. Ball - ERM North Central
N. Bernstein - Arent Fox Kintner Plotkin and Kahn
T. Harker - The Harker Firm
J. Kyle - Barnes and Thornburg
J. Smith - IDEM (3)
F. Mahuta - CH2M Hill (3)

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ENVIRONMENTAL CONTROL AND MAINTENANCE PLAN
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E1 **General Comment.** The potential appears to exist for spills from the drums and tanks being removed from the site. Typically, a plan of action is developed to limit spills and to control releases to soil, surface water, and other environmental media. How will the preparation of such a plan be addressed? Will the contractor provide a plan to limit spills and control releases during construction?

AWD RESPONSE As discussed with EPA, under the revision to the SPMR, drums will not be removed during the SPMR phase. Miscellaneous drums will be handled and stored with existing drums for later removal during the RA stage. The tanks were inventoried and appear to be empty.

The HASP for SPMR, Section 13, addresses spill response, control and cleanup. This section includes requirements for onsite equipment, contractor training and incident reporting as well as procedures for spill responses, both on and off site. In addition, the contractor will be required to submit a Contingency and Emergency Response Plan as required in the Specifications Section 01390 - Health and Safety. The HASP requirements for spill response will be clearly referenced in the ECMP.

E2 **Section 2.2, Page 2-1.** This section does not mention specifically whether a National Pollution Discharge Elimination System (NPDES) Stormwater Permit will be required or applied for. Construction sites over 5 acres typically require a permit. Sometimes a permit may also be required for surface water discharge as a result of any industrial activity at the site (e.g., land application activity or storing of filled drums). Have all permit needs been identified so that an avoidable project delay does not occur in the schedule as a result of having to wait for necessary permits?

AWD RESPONSE An NPDES Permit is not required for SPMR work. During the RA Design, the ECC Trustees will evaluate questions concerning potential onsite and offsite discharges to the creek. During RA implementation the intent of the guidelines outlined in 327 IAC 15 will be followed but actual permit issuance is not required for this SPMR phase of CERCLA site remediation. See 40 CFR 300.400(e) and 53 Fed. Reg. 51406 (December 21, 1988).

Please see AWD response to D2.

E3 **Section 4.3.1, page 4-2.** There appears to be only one access road on drawing C-2 (this document says "roads"), and that is to the equipment laydown area on the south side of the site. Should there be another road on the northwest corner of the site where drawing C-2 says "30' Security Fence Gate"?

AWD RESPONSE All vehicles will enter and exit the site area by existing access roads intersecting with State Route 421. The access roads intersect with State Route 421 near the existing office facility operated by the Boone County Resource Recovery Systems, Inc. (BCRRS). The single access road to the support zone is partly within a non-exclusive access easement held by the NSL Landfill Trustees. (See Drawing C-1). The access road from the support zone to Route 421 is within a BCRRS proposed work area. The Trustees have reported to EPA the status of their efforts to obtain access from BCRRS.

A portion of the access road outside of the support zone will be upgraded by the Remedial Contractor as indicated on Drawing C-2. This access road is referred to in Section 4.3.1 of the ECMP, as the road to be covered with aggregate. The access road outside of the limits will be used jointly by BCRRS and the ECC operations, and it will not be upgraded as part of the SPMR contract. Maintenance of the common access road will need to be coordinated between representatives of the ECC Site and BCRRS prior to implementation of site preparation activities if access can be obtained.

There will not be a road installed at the northwest corner of the site during the SPMR phase. The 30' gate will be installed during SPMR, but the road will not be constructed, and/or the existing road upgraded, until the RA phase of the project. Therefore, the road is not shown on the SPMR Design Drawings.

E4 **Section 4.5, page 4-4.** It is mentioned here that the contractor will have the responsibility to investigate and comply with applicable laws concerning pollution of rivers and streams. Is this something that is better addressed earlier, probably by the designer, to reduce chances for project delays or misunderstandings? Sometimes NPDES permits require stormwater monitoring or detention. Will this be checked before construction begins?

AWD RESPONSE Please see responses to E2 and D2. No potential pollution of rivers of streams is anticipated. The execution of the SPMR is of such limited scope and duration that storm water monitoring is not warranted.

U.S. EPA Comments and AWD Responses
CONSTRUCTION QUALITY ASSURANCE PLAN
Site Preparation and Material Removal

C1

General Comments. The definitions of QA and QC are not clearly defined. What are the differences between QA and QC activities? These plans discuss QC testing requirements and QC roles and responsibilities of the construction contractor but not specific QA roles and responsibilities. CQC is generally the responsibility of the construction contractor to document that the RA meets the requirements of the plans and specifications. CQA is often the responsibility of a party independent of the construction contractor to observe and check the contractor's CQC activities. Will there be an independent QA officer? What CQA authority will the engineer or design engineer have? QA roles and activities, independent from the construction contractor's personnel, need to be clearly defined in the CQA plans.

Decontamination and wastewater storage pad operations are not discussed. These are critical operations for both support zone activities and environmental controls. What is the purpose of each pad? What is the basis for their design? How will each be operated and maintained during SP/MR and RA work?

See specific comments on Design Drawings C-2, Site Preparation and Grading Plan, and C-3, Support Zone Plan, for more detailed comments on environmental controls.

AWD RESPONSE

Quality Assurance (QA) for the SPMR Phase of the Remedial Action is outlined as the program of procedures, standards, guidelines, and systems stated in the Construction Quality Assurance Plan (CQAP). This program will produce sufficient quality in the work in order to meet the project requirements. Quality Control (QC) will be maintained through implementation of the QA program by the contractor using the contractor's QC plan. This will be stated in Section 1.3 CQAP Objectives for the final submittal.

The CQA officer will come from within the ranks of the ECC Trust's Engineer (Engineer) group for the SPMR phase and is responsible for providing confidence to the ECC Trust that the construction activities are being done in accordance with project requirements. Authority for the various personnel involved with QA are as follows:

ECC Trust's Engineer

The ECC Trust's Engineer is employed by the ECC Trust group and has overall authority for construction management with the following responsibilities:

- Provide site access authority for construction support and operation
- Coordinate with regulatory authority
- Receive and coordinate design any necessary change orders
- Issue certification of component and final project completion
- Review claims, disputes, and other matters concerning applicability of work
- Review all shop drawings and submittals.
- Interface with the Contractor and be available to visit the site as necessary or attend meetings at the request of the Trustee's.
- Log shop drawings, samples, and interpret and clarify drawings and specifications as well as substitute proposals and field orders.
- Interpret plans and specifications and consider and include suggested modifications to contract drawings and specifications, and reporting results to the Trustees.
- When requested, perform inspection and tests and submit report to the Trustee's.
- Review routine testing and inspection reports and certification of completion.
- Prepare a list of items which remain to be completed or corrected before certifications of completion are approved.
- Conduct a final inspection with the Trustee's and Contractor
- Determine if certifications, O&M Manuals, and other required submittals have been supplied by the contractor.
- Assist in assembling material needed for the project final report.

Construction Quality Assurance Manager

The CQA Manager, and staff if required, is responsible for implementation at the CQAP through selective testing and inspection at the works being done by the construction contractor(s). The CQA manager will be responsible for development of a QA management plan after submittal of the selected Construction Contractors CQC plan.

The decontamination (decon) pad will serve several purposes in controlling the release of contaminants outside of the exclusion zone (EZ). The decon pad will be used by the contractor for:

- The cleaning of materials intended to be removed during the SPMR phase (i.e., old process tanks, process building materials, general debris);

- Decontamination of personnel and general equipment which will be used within the EZ;

- Decontamination of vehicles supporting operations within the EZ. Operations at the "decon" pad will be primarily the use of high pressure washes which will be collected by a grated drain and sump.

The wastewater storage pad shall be used as a secondary containment area for wastewater storage tanker trucks which will be used for storage of collected decon waters, and any other contaminated liquid generated or staged for disposal.

The "decon" pad has been designed to allow both materials and vehicles access to decontamination operations and to collect both "decon" waters and solids.

The wastewater storage pad has been designed to provide secondary containment of stored wastewater in the event of a release from a wastewater storage tanker truck.

The Decon Pad was sized to accommodate both tank cutting and cleaning and also to provide an area for decon of heavy equipment. The tank decon bay is approximately 33'x 50' and the equipment decon drive-thru bay is approximately 17'x 50'. The pad is constructed of reinforced concrete, 8 inches thick, for durability and performance under dynamic loading conditions caused by heavy tanks and equipment. The pad is equipped with a curb and collection sump which has a liquid storage

volume sufficient to handle precipitation from a 25 year 24 hour storm. Liquids collected in the sump will be transferred to storage tanker trucks located on the adjacent wastewater storage pad.

The wastewater storage pad was sized to accommodate 2 storage tanker trucks for collection of liquids generated during SPMR activities. The pad is constructed with a HDPE membrane and aggregate cover to contain any tanker leaks or spills. These materials are expected to provide suitable performance for storage of tankers and the static loading conditions they present. The pad has a liquid storage volume of approximately 8000 gallons, which is the maximum capacity allowed for the single largest storage tank on the pad.

The selected contractor will be responsible for the operation of the decon pad and will be required to transfer collected "decon" waters from the collection sump to the tanker trucks located on the wastewater storage pad periodically. Solids within the decon pad drain, will be removed and placed into the bulk soils container by the contractor.

The above information will be discussed in the ECMP and SMP as specified in AWD's response to D3. In addition, a brief description will be added to the Technical Specifications Sections 02090 and 02091 which will describe the temporary closure of the decon pad and wastewater storage pad. The purpose of this is to mitigate ponding of water on those pads between phases of the remedy.

The EPA comments on Design Drawing C-2, Site Preparation and Grading Plan and C-3, Support Zone Plan are addressed in AWD's responses to D2 and D3 of the Design Drawing Comments.

C2 Section 2.0, Figure 2-1. Are the "ECC Trust's Group Engineer", The Remedial Design Engineering, AWD Technologies, Inc. Project Manager" or any other people on this figure known at this time?

AWD RESPONSE The SPMR and Remedial Action Design Engineer's Project Manager is known at this time only. He is Bradford K. Grow of AWD Technologies and his phone number is (317) 469-0703. As discussed at our meeting, additional roles will be assigned once the actual contractors are selected to provide the best possible construction and quality assurance management. Please see AWD response to Comment C3 below.

C3 **Section 3.0, page 3-1.** What are the roles and responsibilities of the AWD Engineer's staff for overseeing the contractor's operations? Will there be any independent QA activities for overseeing the contractor's environmental control and maintenance operations? See general comments on CQA plan.

AWD RESPONSE As discussed in our meeting with EPA, AWD is being provided the opportunity to bid on conducting the SPMR work. This is consistent with recent trends in the design and construction of environmental projects. If AWD is the successful bidder for the SPMR work, AWD will serve as the contractor and a third party will be selected to serve as the ECC Trust's Engineer. If AWD is not selected as the SPMR contractor, AWD will serve as the Trust's Engineer, or an engineer independent of AWD will be selected by the Trustees. The choice of an independent engineer will be discussed with EPA should AWD become the SPMR contractor. Since AWD expects to be a bidder, Roy Ball will act as the ECC Trust's Engineer through completion of the bid and award stage. Once the successful bidder is known, work will proceed as stated above.

C4 **Section 5.1, page 5-1.** How is a "major change" defined, and how does it differ from a minor change or change in basic design? Who determines when a major change is needed? What is the proposed process for giving the EPA and IDEM the opportunity to review a proposed major change?

AWD RESPONSE A "major change" is defined as a change in the design of the remedial components, such as the change in the configuration of the support zone facilities or any change that will materially affect the contract price or contract completion date. This type of change will require the additional effort of the Design Engineer with concurrence between all parties. No major change that significantly affects the design or the completion date will be made without IDEM and EPA concurrence.

A "minor change" is a change where limited interaction of oversite contractors or regulators must be involved, such as the decision to use a thicker aggregate base within the support zone roadways, or a mechanical modification in equipment or parts.

Determinination of a major change will be accomplished through interactions between the selected contractor, ECC Trust's Engineer, and the Design Engineer.

After concurrence between the parties above has been reached warranting a major change, the ECC Trust's Engineer will notify EPA and IDEM prior to any redesign work.

C5 **Section 5.1, page 5-2, last paragraph.** How will EPA and IDEM be factored into this process?

AWD RESPONSE EPA and IDEM will be notified if construction problems or deficiencies are found which will necessitate a major change in design or that which would produce a change in schedule.

C6 **Section 6.1, page 6-1.** How will QA/QC reports, data, and test results be made available to the EPA and IDEM? QA/QC information should be available to EPA and IDEM representatives upon request at all times throughout the construction period, not just at the completion of work.

AWD RESPONSE All reporting to IDEM and EPA will be made through and by the ECC Trust's Engineer. Inspection results and sample testing data will be provided from the Resident Superintent to the Engineer, who will in turn provide monthly progress reports to IDEM and EPA incorporating the information. Please see AWD response to T10 and Section 01310 of the Technical Specifications. QA/QC information, as well as all other documentation, will be available on-site with the Resident Superintendent. The term Construction Manager will be changed to Resident Superintendent in all documents.

U.S. EPA Comments and AWD Responses
SITE MANAGEMENT PLAN
Site Preparation and Material Removal

S1 **General Comments.** The roles and responsibility of the Engineer or Design Engineer need to be clearly defined in terms of QA responsibility and authority. See comments on the CQA Plans.

Decontamination and wastewater storage pad operations are not discussed. These are critical operations for both support zone activities and environmental controls. What is the purpose of each pad? What is the basis for their design? How will each be operated and maintained during SP/MR and RA work?

AWD RESPONSE Please see AWD responses to C1 D3, and T22.

S2 **Section 2.1, Page 2-1.** Here, and throughout this document, the term "Remedial Contractor" is used. In the specifications for the Site Prep work, the term "Contractor" is used. Are these two terms the same, or does "Remedial Contractor" refer to the contractor doing the Remedial Action portion of the remedy?

AWD RESPONSE "Remedial Contractor" is the same as "Contractor". The CQAP and SMP will be revised as necessary to have consistent terminology. These terms have been selected for use in the SPMR. These terms may also be used in the RA phase, but this will be spelled out in the RA Plans and Specifications.

S3 **Section 3.1, page 3-1.** Who is the "ECC Trust's Engineer"?

AWD RESPONSE For the purposes of the procurement of the SPMR contractor, Roy Ball will serve as the ECC Trust's Engineer. Please see AWD response to C3. The role of the Trust's Engineer is to assure the SPMR work is conducted in compliance with the SPMR Design.

S4 **Section 4.3.1.** Office and Support Trailers identified in this section do not correspond with Temporary Facilities as listed in Technical Specifications Section 01500. They should be consistent. Office trailer facilities for the EPA and IDEM are not discussed. EPA/IDEM office trailers have been planned and should be discussed in the site management plans.

AWD RESPONSE The SMP will be revised to be consistent with the Technical Specifications. Drawing C-3 delineates a "Trailer Area". This will serve as the location of contractor oversite, and regulatory trailers.

S5 **Section 4.5.1, first paragraph.** Good job in acknowledging needed coordination with NSL Site's access agreement. Please acknowledge here, as is done in the specifications, that the ECC Site and BCRRS will share the same road.

AWD RESPONSE See AWD response to E3.

S6 **Section 7.2.** Need to make sure appropriate personnel have County Sheriff's number. Also, there is no mention of coordination between the ECC Site, Northside Sanitary Landfill Site and local business personnel during emergency situations.

AWD RESPONSE The County Sheriff's (317/482-1412) number will be added to the SMP.

The telephone numbers and contacts for emergency coordination have been provided in the Health and Safety Plan. The SMP will be modified to duplicate a list of phone numbers and coordination contacts. At the time of mobilization for these activities, initial phone calls will be made to local emergency support organizations. The same will be true prior to the start of RA.

U.S. EPA Comments and AWD Responses
QUALITY ASSURANCE PROJECT PLAN
Site Preparation and Material Removal

Q1 **Signature Page.** Please provide a signature page at the beginning of the document. A sample is attached for your information.

AWD RESPONSE A Signature Page will be inserted prior to Table of Contents using the format provided. Thank you.

Q2 **Section 1.0.** Please provide a project schedule. A milestone table or bar chart consisting of project task and time lines is appropriate.

AWD RESPONSE The project schedule will be inserted at Section 1.6. A schedule was worked out at our meeting with EPA. This schedule has been attached for your review and will be incorporated in the appropriate project plans.

Q3 **Section 1.4.3, page 1-20.** Under composite sampling it is mentioned that the sampling approach for these materials will be submitted to IDEM for review. Copies should be sent to the IDEM Project Manager as well as Special Wastes Section so coordination with Hazardous Waste can also be made.

AWD RESPONSE The contractor will be responsible for adapting the Field Sampling Plan (Appendix A in the SPMR QAPP) to the necessary tasks involved with removal of all unwanted items within the site boundaries scheduled for remedial action (Please see response to Q14). These tasks include the evaluation of materials in order to determine the most efficient approach to sampling and testing for characterization and disposal. After this has been completed by the contractor, certain material will be recognized as pertinent for evaluation by IDEM for approval as a "Special Waste" or otherwise, all in accordance with applicable law. Documentation identifying these materials along with the Field Sampling Plan and any modifications deemed necessary by the contractor will be supplied to the IDEM Project Manager and the Special Waste Section for appropriate evaluation and coordination.

Q4 **Section 1.5.3 and Table 7-1.** DQO levels (1, 2, and 3) are not well defined. Please define.

AWD RESPONSE These levels are distinguished by the types of technology and documentation used, and their degree of sophistication as follows:

- LEVEL V - Non standard methods. Analyses which may require method modification and/or development.

- LEVEL IV - CLP Routine Analytical Services (RAS). This level is characterized by rigorous QA/QC protocols and documentation and provides qualitative and quantitative analytical data. Some regions have obtained similar support via their own regional laboratories, university laboratories, or other commercial laboratories.

- LEVEL III - Laboratory analysis using methods other than the CLP RAS. This level is used primarily in support of engineering studies using standard EPA approved procedures.

- LEVEL II - Field analysis. This level is characterized by the use of portable analytical instruments which can be used on-site, or in mobile laboratories stationed near a site (close-support labs). Depending upon the types of contaminants, sampling matrix, and personnel skills, qualitative and quantitative data can be obtained.

- LEVEL I - Field Screening. This level is characterized by the use of portable instruments which can provide real-time data to assist in the optimization of sampling point locations and for health and safety support. Data can be generated regarding the presence or absence of certain contaminants (especially volatiles) at sampling locations. Essentially non-qualitative; quantitative only for total organics.

Q5 **Section 2.0.** Please identify all laboratories that will be used for this project, provide their addresses, and specify the analyses each will perform.

AWD RESPONSE The laboratories will be selected by the SPMR bidders. The laboratories that will be acceptable for evaluation by the bidders will have been pre-selected via inclusion on the US EPA's list of approved laboratories appropriate for this scope of work.

Q6 **Section 2.10, page 2-5.** How will approval from EPA/IDEM be coordinated here?

AWD RESPONSE The laboratories will be selected from EPA's pre-approved list. IDEM and EPA will be notified of the laboratory(s) that have been selected.

Q7 **Section 5.** Please provide the chain-of-custody procedures for all laboratories.

AWD RESPONSE The chain-of-custody procedures for the laboratories will be included in the laboratories' QAP. Since the laboratories will be selected from EPA's pre-approved list, the laboratories chain-of-custody procedures should be acceptable to EPA.

Q8 **Section 7.0, Table 7-1.** Please revise the following in Table 7-1:

1. Expand the term "compatibility test" to list all tests and their analytical methods.
2. Expand the TCLP to include all analytes (i.e., VOCs, semi-volatiles, metals, etc.). Specify the analytical methods, extraction procedure, and digestion procedure for the leachates.
3. Specify the holding times for TCLP leachates.
4. The Data Quality Objectives (DQO) for PCBs analysis must be at least level "3". Please correct.

AWD RESPONSE This table will be revised as specified above for the Final Remedial Action Design submittal and to reflect the decision not to remove on-site drums during the SPMR phase.

Q9 **Section 7.0.** Please provide a list of method detection limits for TCLP leachate analyses and PCBs. Also, please provide Standard Operating Procedures (SOPs) for TCLP leachate analyses and PCBs. The procedures must include the extraction or digestion procedure if applicable.

AWD RESPONSE Laboratory Standard Operating Procedures (SOP)s and detection limits are based upon the sample matrix and the in-house equipment. All this information will be included in the laboratory QAP which will be attached to the project QAPP when the laboratory is selected.

Q10 **Section 9.2.** The discussion on data validation is inadequate. Please describe the criteria/guidelines/procedures to be used for data validation.

AWD RESPONSE The section will be rewritten for the Final Design submitted to include the following reviews:

The selected Remedial Contractor's Quality Assurance Officer (QAO) will provide the following review of all data:

- A check on the comparability of field duplicate, laboratory matrix spike, and field and laboratory blank analytical results.
- A check on received results against chain-of-custody records to determine completeness.
- Assessment of whether the samples were properly collected and handled according to the Field Sampling Plan (FSP) and Section 5.0 of the QAPP.
- Review of internal laboratory QA/QC as outlined within appropriate methodology and individual laboratory Standard Operating Procedures (SOP's).

Additional validation effort may be recognized after selection of the laboratories which will provide the necessary analytical work in order to characterize unwanted material and debris for disposal options. Any waste which is intended for disposal as a Special Waste through IDEM will have validated data presented along with application to IDEM's Special Waste Group and the IDEM Project Manager.

Q11 **Section 11.2.** The discussion on laboratory preventative maintenance is not acceptable. Please describe preventative maintenance procedures to be used for laboratory instruments. A table showing the type of maintenance to be performed and the frequency is appropriate.

AWD RESPONSE See AWD responses to Q5, Q6, Q7, Q9. This information will be included in the laboratory QAP which will be attached to the project QAPP upon selection of the laboratory(s).

Q12 Section 4.2.3, page 4-2. Drummed solids may be placed back onsite only with prior approval of U.S. EPA and IDEM.

AWD RESPONSE No drummed soils will be handled during the SPMR phase. In addition, no drummed or binned solids will be placed back onsite without USEPA and IDEM approval.

Q13 **Section 4.3, page 4-3.** The last sentence should read, "These waters **will be held separately until found compatible with the tanker liquids and/or acceptable to the liquid waste treatment facility.**"

AWD RESPONSE The correction to this sentence will be made for Final Design submittal.

Q14 **Section 4.4.** All materials and debris will have to be handled as "Special Waste" if not characterized as hazardous by test results. Also, last line of bullet, landfill permitted for acceptance of Special Waste need not be a "municipal waste landfill".

AWD RESPONSE There are many items at the site which may be salvaged. As discussed in 329 IAC 2-21, there are four general categories of materials including: RCRA regulated hazardous waste, special waste, solid waste that is neither considered hazardous nor special waste, and excluded materials including salvage material. In accordance with State regulations for the purposes of SPMR and meetings with IDEM, not all debris will be handled as special waste.

On April 28, 1993, AWD received the following information from IDEM regarding requirements for disposal of debris at ECC during the SPMR:

Removal of the transformer by the utility for reuse or recycling is allowable. The utility (or whomever removes the transformer from the pole) must follow the contractor's Health and Safety Plan when going onto the site.

Non-leaking fluorescent light ballasts may be disposed of as general solid waste in groups of 25 or less at a time. Multiple shipments of 25 or fewer ballasts is acceptable to meet this requirement. If more than 25 ballasts are disposed of in one shipment, special waste approval must be obtained from IDEM.

Any leaking fluorescent light ballasts containing PCB's must be disposed of in accordance with TSCA regulations or 329 IAC 4.

Fluorescent tubes must be handled as RCRA hazardous waste. IDEM has historical information that 50% of fluorescent tubes tested have failed TCLP for Cd, Pb, and/or Hg.

IDEM agrees that salvage of metal and salvageable materials is the best final disposition of this material. Salvageable metals that can be decontaminated, including such items as the snowmobile bodies and cut up tanks, may be salvaged with no formal notice or approval from IDEM required. All materials slated for salvage must be decontaminated and decontamination records maintained.

According to IDEM, pesticides in the three gallon containers may be disposed of in accordance with FIFRA regulations or given away for reuse.

Asphalt shingles on the A-frame building, if friable, should be handled as asbestos unless shown not to contain asbestos.

If the contractor has reason to believe that surface debris is contaminated when slated for disposal, Special Waste certification must be obtained prior to disposal. This would apply to materials that cannot be decontaminated, ex. wood, brick etc.

Any material contaminated by listed hazardous waste which, when tested, has detectable hazardous waste constituents, must be handled as a hazardous waste for disposal (mixture rule).

The appropriate section in the Technical Specifications will be modified to include the above disposal requirements.

We agree that special waste may be disposed of in any permitted landfill approved by IDEM for acceptance of special waste. This will be re-stated, and the term municipal detected from the Final Design Submittal.

Q15 **Section 5.1.3, page 5-3.** **Drum overpacks should be available to over pack any drums that are in poor condition.**

AWD RESPONSE Drums overpacks will be available onsite as a routine precautionary measure, but it is not anticipated that they will be required since drum removal has been removed from the SPMR scope of work.

Q16 **Section 5.2.2, page 5-4.** Under sampling procedures from tanker from bottom valve, item #6 indicates that visqueen and sorbent pads will be "picked up" (check spelling here) and placed in appropriate container. There is no mention of placement of these materials under the valve before sampling.

AWD RESPONSE This was worded in error. No visqueen or sorbent pads are required since the tanker is already within secondary containment area. This will be omitted for Final Design submittal.

Q17 **Section 5.5, page 5-7.** Samples will be preserved and stored, not stored in preservative. How will holding samples affect relevant holding times?

AWD RESPONSE The appropriate change will be made to text for Final Design submittal. Samples will be shipped on a daily basis so that holding times will not be compromised.

Q18 **Section 6.3.2, page 6-3.** Why is the decontamination procedure here more stringent than that used for soil vapor extraction in Section 6.2, Table 6-1, page 6-5 of the QAPP, Volume II, Field Sampling Plan, Remedial Action? Also, please remove acetone as a rinse solvent in the decontamination procedure, because it is a volatile analyte of interest.

AWD RESPONSE The procedures are actually the same except for an acid rinse which is required when sampling for inorganic analysis. The procedures in the individual documents will be identical for the Final Design submittal. Acetone will be removed as one of the solvent rinse constituents leaving methanol or hexane for this "decon" step.

Q19 **Section 7.4.** In this section, please include a discussion of time consideration for shipping samples to the laboratory (i.e., shipped by overnight courier). Also, no discussion was provided on preparing sample containers. Sample containers must be prepared according to the procedures specified in USEPA's "Specifications and Guidance for Obtaining Contaminant-Free Sample Containers. April 1990" and certificates of cleanliness must be maintained by the contractor. A copy of this guidance is attached for your use.

AWD RESPONSE This section will be revised to include the use of ovenight couriers for shipments to the laboratory. The sample container specifications have recently been received from EPA. The actual title is: "Specifications and Guidance for Contaminant Free Sample Containers. April 1990." This will be added as an appendix to the QAPP.

Q20 **Section 7.4.1, page 7-4.** All bottles should be placed in plastic bags.

AWD RESPONSE This addition will be made for Final Design submittal.

Q21 **Section 7.4.1, page 7-4.** Loose ice should not be placed in any cooler containing samples. Melted ice may contaminate/cross contaminate samples.

AWD RESPONSE The addition will be made for Final Design submittal.

Q22 **Appendix A, Table 1.** For those tanks with identified insulation (assumed on outside), is there a possibility that this material is composed of asbestos? Or that it is contaminated? Will it require testing prior to disposal?

AWD RESPONSE The removal item inventory which was performed in November 1992 proved this insulation to be thermal foam insulation. All material from the tanks other than steel and not slated for salvage, will be placed in the onsite hazardous disposal roll-off or documentation will be submitted to IDEM Special Waste group during application for disposal as a special waste.

Prior testing will be done only if required by IDEM Special Waste group.

Q23 **Appendix A, Table 3.** Disposal of transformers on poles outside of the process building and fluorescent light ballasts must consider PCB regulations.

AWD RESPONSE The disposal of these items has been discussed in the AWD response to Q14. The local utility has indicated that these transformers are their property and that they will remove and haul them off for proper recycling and reuse. The IDEM has indicated that any non-leaking ballasts may be disposed of as general solid waste in groups of 25 or less. Any leaking ballasts must be disposed of in accordance with 329 IAC 4. Per requirements of IDEM, whole flourescent tubes will be disposed of as RCRA hazardous waste.

Modification to Technical Specification Section 02083 - Structures will be made to reflect this information.

U.S. EPA Comments and AWD Responses
TECHNICAL SPECIFICATIONS
Site Preparation and Materials Removal

T1 **General Comment:** The Consent Decree states that site prep work will be done in 4 months; this document says SPMR with last for 5 months. Please correct.

AWD RESPONSE See response to Q2. The SPMR execution from mobilization through completion of work will be 4 months.

T2 **General Comment:** How were the exact coordinates obtained for the remediation boundaries?

AWD RESPONSE The coordinate values of the Remedial Boundary and the parcel within which it lies are taken from a survey of the property by Schneider Engineering Corporation, 3020 North Post Road, Indianapolis, Indiana. The original Remedial Boundary coordinates used by Schneider were taken from USPEA documents prepared by CH2M Hill. Schneider used these and their survey coordinates to develop a local description of the property. The survey is shown on a Schneider drawing titled "Boundary Survey" which was prepared for the Enviro-Chem Trust. The drawing is further identified by "Sheet 1 of 1, Job No. 799.05, Sections 2, 3, 11, Township 18N, Range 2E, drawn by EJE, Date 10/27/92", and certified by Evan J. Evans, registered land surveyor #910024, as being in accordance with 865 IAC 1-12 ("Rule 12") and completed October 23, 1992.

T3 **Section 01012, Part 1.02.B.2.** The ECC site closed for business in 1982 not 1992 as indicated.

AWD RESPONSE This will be corrected in the final version of the SPMR Technical Specifications.

T4 **Section 01012, Part 1.03.** The SVE pilot test was done after the feasibility study.

AWD RESPONSE This will be corrected in the final version of the SPMR Technical Specifications.

T5 **Section 01015, Part 1.01.B.** Who is the "ECC Trust's Engineer"?

AWD RESPONSE Please See AWD's responses to C3 and S3.

T6 **Section 01015, Part 1.01.C.1.d, and 01015, Part 1.01.C.3.a..** What and where is the "temporary construction fence" and "site security fence"?

AWD RESPONSE The temporary construction fence (high visibility fence) specifications are given in Section 02800, Part 2.01.C, and its location is shown on Drawing C-2. The site security fence (chainlink fence) specifications are given in Section 02800, Part 2.01 A, and its location is shown on Drawing C-2.

T7 **Section 01050, Part 3.04.B. and Section 01210, Part 1.03.A.** Are the "Contractor's Field Superintendent" and the "Contractors superintendent" the same person?

AWD RESPONSE Yes, the Contractor's Field Superintendent and the Contractor's Superintendent are the same person. The final version of the SPMR Documents will use the term Resident Superintendent for this person.

T8 **Section 01300, Part 1.01.B.** We appreciate the list of submittals that EPA and IDEM will review prior to the Engineer's approval. EPA and IDEM will work out with the Project Coordinator a list of submittals that EPA and IDEM will want to formally review; the remainder of the submittals, we expect, will only need to be submitted to EPA's contractor onsite.

AWD RESPONSE This comment has been noted and we agree.

T9 **Section 01300, Part 1.02.19.** Will we get the Offsite Spill Contingency Plan prior to the pre-work conference?

AWD RESPONSE Yes, the Contingency and Emergency Response Plan will be submitted to the U.S. EPA and IDEM prior to the pre-work conference. Onsite and offsite spills and contingencies will be addressed in the Contingency and Emergency Response Plan to be submitted as part of the Contractor's Health and Safety Plan. The offsite Spill Contingency Plan has been eliminated from the submittal list. The final version of the SPMR Technical Specifications will be revised accordingly.

T10 **Section 01310, Part 1.07B.d.** The Progress Reports submitted to EPA and IDEM, per pages 23 and 24 of the Consent Decree need to include more than just the Contractor Monthly Progress Report.

AWD RESPONSE AWD Technologies, Inc. and the ECC Trust are aware that the Progress Reports submitted to U.S. EPA and IDEM per the Consent Decree need to include more information than just Contractor Monthly Progress Reports. The Progress Reports will be the responsiblity of the ECC Trust's Engineer. The Technical Specifications identify the information that the Engineer will require from contractor for completion of the Progress Reports.

T11 **Section 01385-3, Part 1.03.C.2.** Landfill need not be "municipal" as long as properly permitted.

AWD RESPONSE The term "permitted municipal landfill" will be revised to "permitted landfill" throughout the final version of the SPMR Technical Specifications. We agree that the landfills only need to be properly permitted and not owned by municipalities.

T12 **Section 01393, Subsection 1.02, page 01393-1.** What is CQA and how does it differ from CQC, as defined in Section 01400? Who is the CQA Manager? Is the CQA Manager employed by the Contractor or and independent party? This position is not identified in the CQA Plan; only the CQC Manager is defined. See comments on the CQA Plan.

AWD RESPONSE Construction Quality Assurance for the SPMR phase of the Remedial Action is defined as the program of procedures, standards, guidelines, and systems stated in the Construction Quality Assurance Plan which will provide sufficient quality in the work to meet the project requirements. Construction Quality Control for the SPMR phase of the Remedial Action is the implementation of the CQA program by the Contractor through the use of the Contractor Quality Control Plan in accordance with Section 01400 of the SPMR Technical Specifications.

Some confusion in the project organization was introduced by inconsistencies presented in the Draft SPMR documents. AWD apologizes for this and these inconsistencies will be corrected in the Final SPMR documents. Please see AWD's response to C1.

T13 **Section 01395.** See comments on Drawings C-2 and C-3 and the Environmental Control and Maintenance Plan.

AWD RESPONSE The comments on the Drawings and the Environmental Control and Maintenance Plan are addressed under the respective sections of the response letter.

T14 **Section 01395, Part 3.01.C.** Have "wetland designated areas" been identified at the ECC site?

AWD RESPONSE No wetlands have been identified at the ECC Site. Therefore, Section 01395, Part 3.01.C of the final version of the SPMR Technical Specifications will be deleted.

T15 **Section 01410, Subsection 1.02, paragraph E, page 01410-1.** How can the EPA require a contractor to correct laboratory QA deficiencies? Only the ECC Trust has the contractual authority to do this. The ECC Trust has sole responsibility with respect to the performance of its constructors.

AWD RESPONSE The purpose for selecting a laboratory that has been pre-approved by EPA is to assure that the lab has a QA program in place and that it has been audited. It will be the ECC Trusts Engineer's responsibility to seek to assure that the lab's QAP is followed. The final version of the SPMR Technical Specifications will include this revision.

T16 **Section 01510, Part 3.01.A.** What about the separate line to the security station?

AWD RESPONSE A telephone line will be added to the security station. Section 01510, Part 3.01.B of the final version of the SPMR Technical Specifications will be revised accordingly.

T17 **Section 01510, Part 3.03.A.** Will water supply be available for personnel decontamination as well as equipment, etc.?

AWD RESPONSE Yes, a quantity of clean water will be supplied by the Contractor for personnel and equipment decontamination, safety and emergency response, and other potable water needs. In addition, the Contractor shall provide drinking water sources inside all trailers. This information will be contained in Section 01510, Part 3.03 of the final version of the SPMR Technical Specifications.

T18 **Section 01700, Subsection 3.01, page 01700-3.** All project records should be made available to the EPA/IDEM on request throughout SP/MR activities.

AWD RESPONSE For SPMR, all relevant project documentation will be on site and available for review by agency members. This does not include contractural language, cost information, or internal correspondence between the Trustees and their selected contractor. This does include all approved plans, drawings and specifications, reports, analytical data, and QA/QC information.

T19 **Section 2081, Part 3.02.A.4.** The tank "interior" as well as exterior should be tested for vapors prior to execution of step 5. (cut open ends of tank).

AWD RESPONSE Yes, the tank interior and exterior shall both be checked for vapors prior to any cutting being performed. Section 02081, Part 3.02A. of the final version of the SPMR Technical Specifications will be revised accordingly.

T20 **Section 02090, Subsection 2.01, paragraphs A and B, page 02090-1.** Drawing C-5 calls for a Neenah Model R-4990-E rather than R-4990-EX trench frame and grate. Drawing C-5 also calls for a Neenah Model R-1740-D2 rather than R-1740-02 manhole frame and lid. Which is correct?

AWD RESPONSE The proper trench frame and grate is Neenah Model R-4990-EX. The proper manhole frame and lid is Neenah Model R-1740-D2. The final versions of the SPMR Technical Specifications and SPMR Design Drawings will be revised accordingly to include these changes.

T21 **Section 02090, Subsection 3.01, paragraph C.3, page 02090-2.** Drawing C-5 calls for a 6-foot diameter manhole rather than 6-inch. Is this correct?

AWD RESPONSE The precast concrete manhole will have a 6-foot diameter. Section 02090, Part 3.01.C.3, of the final version of the SPMR Technical Specifications will be revised accordingly.

T22 **Section 02091.** The purpose of the wastewater storage pad is not explained here, in the Site Management Plan, or in the Environmental Control and Maintenance Plan. See comments on the Site Management and Environmental Control and Maintenance Plans.

AWD RESPONSE Please see AWD response to C1 and D3. The wastewater storage pad shall be used as a secondary containment area for wastewater storage tanker trucks which shall be used for storage of collected decontamination

waters and any other contaminated liquids generated or staged for disposal. The final version of the SPMR Technical Specifications, the ECMP, and the SMP will be revised to include this terminology.

T23 **Section 02091, Subsection 2.01, paragraph B, page 02091-1.** What is the basis for a melt index of <1.1 g/10 minutes listed under 2.01 B?

AWD RESPONSE The Melt Flow Index should be ≤ 0.3 g/10 min. This will be corrected in the final version of the SPMR Technical Specifications. The Gundle Lining System explanation of melt flow index is as follows: "A melt flow index provides an indication of a polymer's molecular weight, viscosity, and processability. The test method measures the rate of extrusion of molten resins through an orifice of a specified length and diameter under prescribed conditions of temperature, load, and piston position in the barrel. Flow rates of the polymermelt through the orifice are measured in grams per 10 minutes. Not only does the test provide an indication of average molecular weight, but the uniformity of flow rate of the polymer resins may be indicative of uniformity of other polymer properties."

T24 **Section 02091, Subsection 2.01, paragraph D, page 02091-1.** Should the environmental stress crack resistance test be ASTM D 1693, listed under 2.01 D? The environmental stress crack resistance criteria of 0 failures in 1,000 hours minimum seems low compared to Gundle Lining Systems, Inc., specification of 0 failures in 2,000 hours minimum. What is the basis for lower specification?

AWD RESPONSE The environmental stress crack resistance test will be changed to ASTM D 1693 in the final version of the SPMR Technical Specifications.

The environmental stress crack resistance should be 0 failures in 1500 hours minimum as per the Gundle Lining Systems, Inc., specification. This change will be made in the final version of the SPMR Technical Specifications. Please note that our most recent Gundle specifications call for 0 failures in 1500 hours minimum.

T25 **Section 02091, Subsection 2.01, paragraph H, page 02091-3.** What does "film tear bond" mean as the specified strength for peel adhesion? What is the minimum peel adhesion strength value required for a seam test?

AWD RESPONSE Section 2091, Part 2.01.H was incorrect in the draft version of the SPMR Technical Specifications. It was incorrectly written for PVC liner material rather than HDPE liner material seaming procedures. The final version

of the SPMR Technical Specifications will be revised to include the correct information on HDPE liner seaming procedures.

T26 **Section 02091, Subsection 3.01, page 2091-3.** Are any nondestructive or destructive test [sic] required for the geomembrane liner seams? No QC testing for liner seams is described in this section or the CQA Plan. How will seam quality be checked and documented?

AWD RESPONSE Nondestructive and destructive tests are required for HDPE geomembrane liner seams. QC testing for liner seams will be addressed in the final versions of the SPMR Construction Quality Assurance Plan and Quality Assurance Project Plan.

T27 **Section 2180, Part 3.03.** Confined space permit may be required during construction and final inspection of the manhole.

AWD RESPONSE In the event that a confined space entry permit is required during construction and final inspection of the manhole, it will be the Contractor's responsibility to issue it. Section 02180, Part 3.03 of the final version of the SPMR Technical Specifications will be revised accordingly.

T28 **Section 02200, Subsection 3.07, page 2200-8.** What density and moisture contents are required for compacted fill? Will any QC testing be completed for placing and compacting fill?

AWD RESPONSE The maximum fill thickness within the support zone is 12 inches in a small portion of the earthwork area. The majority of the earthwork in the support zone is excavation. The fill areas will be compacted by the movement of the earthmoving equipment which is expected to provide suitable compaction for support zone requirements. Specific compaction specifications are not warranted for this limited earthwork effort and anticipated loadings within the support zone. Visual QC will be performed and is explained in the CQAP.

T29 **Section 02224, Part 2.01.A.** "...approved onsite natural deposits...". Who "approves" these deposits? Where are they? Are they in fact "onsite" (i.e. on the ECC site)?

AWD RESPONSE The Borrow Area for suitable fill shall be chosen by the contractor and approved by the ECC Trusts Engineer. The Borrow Area will not be

located on the ECC Site. Section 02224 of the final version of the SPMR Technical Specifications will be revised accordingly.

T30 **Section 02280, Subsection 3.01, paragraph F, Page 2280-3.** What is the minimum required seam overlap?

AWD RESPONSE The minimum required overlap for geotextile placement is 2 feet. Section 02280, Part 3.01.F of the final version of the SPMR Technical Specifications will be revised accordingly.

T31 **Section 02700, Subsection 3, page 2700-3.** The Environmental Control and Maintenance Plan states that erosion control structures will be repaired and maintained throughout SP/MR activities. The technical specifications do not discuss repair and maintenance requirements for erosion control structures. How will the contractor be required to maintain erosion control features if it is not stated in the specifications? See comments on the Environmental Control and Maintenance and Site Management Plans.

AWD RESPONSE A new section titled "Section 02720 - Maintenance" will be added to the final version of the SPMR Technical Specifications to address contractor maintenance during SPMR activities.

T32 **Section 02710, Subsection 3, page 2710-3.** Section 02710 - Vegetation, Part 3 - Execution: Will there be a warranty period for establishing the vegetative cover? How will repair and maintenance be completed, especially before the vegetative cover is well established? See comments on Section 2700 - Erosion Control.

AWD RESPONSE There will be no warranty period for the vegetation. Repairs and maintenance will be made in accordance with Section 02720 - Maintenance in the final version of the SPMR Technical Specifications.

T33 **Section 03200, Subsection 2.01, paragraph B.1, page 03200-2.** See ACI 318, 3.5.3.1(b) for additional requirements.

AWD RESPONSE The additional requirements from ACI 318, 3.5.3.1 (b) will be included in the final version of the SPMR Technical Specifications.

T34 **Section 03200, Subsection 3.01 page 03200-3.** A coating of cement slurry may affect the bond in the final installation. An alternative method of protection, if needed, should be specified.

AWD RESPONSE The minimal amount of reinforcement on this project will not be left exposed for a long period of time. Therefore, Section 03200, Part 3.01.C will be deleted from the final version of the SPMR Technical Specifications.

T35 **Section 03200, Subsection 3.03, paragraphs B and C, page 03200-4.** Will lap splice requirements be coordinated with ACI 318-89 (rev. 1992)? The requirements have changed and Class C splices no longer exist in ACI 318. Will the reference be changed from "ACT 315" to "ACI 315?"

AWD RESPONSE Splicing of reinforcement will be coordinated with ACI 318-89 (rev. 1992), and the final version of the SPMR Technical Specifications will be revised accordingly. Also, the reference to ACT 315 will be changed to ACI 315 in the final version of the SPMR Technical Specifications.

T36 **Section 03200, Subsection 3.03, paragraph D, page 03200-4.** Consider requiring A706 deformed bars where welding splices are required. See ACI 318, 3.5.2.

AWD RESPONSE Section 03200, Part 3.03 will be revised to refer to ACI 318 for splicing requirements in the final version of the SPMR Technical Specifications.

T37 **Appendix A, Table 2, Drum Storage Area 1.** The drums here are from the ECC site, Northside Sanitary Landfill, and the Third Site.

AWD RESPONSE This Table will be revised accordingly in the final version of the SPMR Technical Specifications.

U.S. EPA Comments and AWD Responses
DESIGN DRAWINGS
Site Preparation and Material Removal

D1 **Drawing C-1.** Along the east side of the Unnamed Ditch [sic] is the designation "New 8' Chain Link FNC Generally Along Line". Is the fence that the NSL Trustees installed? [sic] Does this fence define the "buffer zone" on the east side of the site? Where is the fence along the south side of ECC?

AWD RESPONSE The Trustees for ECC and/or NSL did not install any of the ECC fences. Currently, the "buffer zone" is considered to be the unnamed ditch. The RA design will take into account any activities that will occur in this area. All ECC design will be coordinated with NSL by direct communication between the respective Resident Superintendents. The fence continues south past the ECC Site and eventually goes east generally along the NSL Site boundary.

D2 **Drawing C-2.** How was the "Remedial Boundary (Typ.)" determined for this drawing? How will this boundary be marked in the field? These issues should also be discussed in the Environmental Control and Maintenance Plans and the Site Management Plans. Also, what controls will be used to prevent potentially contaminated surface water runoff from within the remedial boundary from entering the diversion channels during both SP/MR and RA work? How will surface water runoff be monitored during onsite activities? What controls will be implemented to prevent releases to the unnamed ditch and Finley Creek? These issues need to be discussed in the Environmental Control and Maintenance Plans and Site Management Plans. Also, is there supposed to be a paved road shown at the northwest corner of the site? Also, please show all proposed fences and designate the NSL Trustees fence as such, if it is shown.

AWD RESPONSE Please see AWD response to T2. The Remedial Boundary location was taken from a survey of the property by Schneider Engineering Corporation, 3020 North Post Road, Indianapolis, Indiana. The original Remedial Boundary coordinates used by Schneider were taken from US EPA documents prepared by CH2M Hill. The survey is shown on a Schneider drawing Titled "Boundary Survey" which was prepared for the Enviro-Chem Trust. The drawing is further identified by "Sheet 1 of 1, Job No. 799.05, Sections 2, 3, 11, Township 18N, Range 2E, drawn by EJE, Date 10/27/92", and certified by Evan J. Evans, registered land surveyor #910024, as being in accordance with 865 IAC 1-12 ("Rule 12") and completed October 23, 1992.

The Remedial Boundary Corners will be located with standard surveyor's hub and tack driven flush with the ground and witnessed by flagged piece of lath.

SPMR activities will be controlled to minimize intrusion into the concrete pad and clay cap. Therefore, surface runoff is not expected to contain any hazardous substances. If site conditions during SPMR are unsuitable for routine operations of equipment and vehicles within the remedial boundary such that rutting or cap erosion may occur, a temporary haul road will be constructed to accommodate all vehicular equipment. This road would prevent direct disturbance of contaminated subsoils and associated runoff. The need for this haul road will be determined by the ECC Trusts' Engineer and U.S.EPA during initial stages of site activities.

Remedial Action activities associated with SVE and the cap will be addressed in a separate design package.

Based on the SPMR activities, we do not expect hazardous substances to be present in the surface water runoff. Therefore, we have not proposed sampling and/or monitoring at the present time for surface water runoff. Please see AWD response to E2.

Any spills of hazardous substances as a result of onsite handling of contaminated materials are addressed in the Contingency and Emergency Response Plan which will be part of the Contractor Health and Safety Plan.

There will not be a paved road installed at the northwest corner of the site during the SPMR phase of the Remedial Action. The gate will be installed during SPMR but the road will not be constructed until the Remedial Action phase of the project. Therefore, the road is not shown on SPMR Drawing C-2. Please see AWD response to E3.

D3 **Drawing C-3.** How were the support zone and exclusion zone boundaries determined for this design drawing? How will these boundaries be marked in the field? These issues should also be discussed in the Environmental Control and Maintenance Plans and Site Management Plans. The decontamination pad and wastewater storage pad operations should also be discussed in the Environmental Control and Maintenance Plans and the Site Management Plans. Also, Exhibit A to the Consent Decree shows the remediation boundary on the north side of the site to extend 265 feet; this drawing shows 264 feet. How were the exact remediation boundaries determined?

AWD RESPONSE Please see AWD Responses to T2 and D2. The support zone was agreed on by the ECC Trust, AWD Technologies, Inc., and Boone County Resource Recovery Systems, Inc. The exclusion zone boundary was set at a distance of 25 feet outside the Remedial Boundary. This 25 feet acts as a buffer zone to ensure that anyone inside the exclusion zone is properly protected.

The boundary corners will be located in the field by a standard surveyor's hub and tack driven flush with the ground and witnessed by a flagged piece of lath. The physical location of the boundary lines will be marked in the field by fencing as shown in Drawing C-3. The physical marking of the boundaries will also be described in the final versions of the ECMP and SMP as specified in the EPA comment.

AWD provided discussion of the decontamination pad and wastewater storage pad operations in response to C1 and T22. Discussion of these operations will also be included in the final version of the ECMP and SMP as specified.

The northernmost line of the Remedial Boundary is indicated as being 264.00' (two hundred sixty-four and no/100ths feet) long as per the above referenced Schneider Engineering Corporation boundary survey. Figure 2-3 of Exhibit A to the Consent Decree indicates this line as being 265' in length. The location coordinate table on Figure 2-3 lists point 1B as 3+76 N by 1+22 W, and point 1D as 3+76 N by 1+42 E, a difference of 264'. The table is correct, and the notation 265' on the line itself is in error and should read 264'. It should be noted that Figure 2-3 of Exhibit A to the Consent Decree indicates several distances which are in error that have been superseded by the Schneider Engineering Corporation survey.

Finally, discussions with the property owners continue in an effort to resolve the area utilized. See April 30, 1993 letter from John Kyle to Karen Vendl.

D4 **Drawing C-5.** Consider replacing vertical construction joints at face of curb with horizontal construction joint in perimeter frost wall to reduce the chance of leakage through the joints. What wire gauge will you look for in the fabric's welded wire? Will reinforcing spacing be coordinated with ACI 318, 7.12.2.2, which is typically used? Reinforcing in sump walls and base slab does not appear to be adequate for crack control. Have the consequences of leaks from cracks in the sump be [sic] considered? What will be done to prevent leaking from cracks in the sump? Why is there no specification for rough carpentry?

AWD RESPONSE It is our opinion that the 9-inch PVC Waterstop placed between the interior slab and the vertical perimeter frost wall adequately addresses leakage at this construction joint. As per SPMR Technical Specifications Section 03250, Part 3.01, "PVC Waterstops shall be spliced and/or joined in conformity with the manufacturer's recommendations to form a continuous seal along the joints and at intersections".

The welded wire fabric (WWF) size will be 6x6 - W2xW2. The nominal wire diameter for this designation is 0.160 inch.

Reinforcing spacing design shall be coordinated with ACI 318, Part 7.12.2.2 and revised accordingly in the final version of the SPMR Technical Specifications and SPMR Design Drawings.

Reinforcing in the sump walls and base slab have been modified to address crack control. The WWF was designed as per ACI 360R-92 titled, "Design of Slabs On Grade", Chaper 6.

The SPMR Technical Specifications will also be modified to include periodic cleaning and visual inspection of the decontamination pad. Visually identified cracks in the decontamination pad or the sump shall be sealed using Conseal CS-912 polypropylene hot melt sealant.

U.S. EPA Comments and AWD Responses
HEALTH AND SAFETY PLAN
Site Preparation and Materials Removed

H1 **Section 1.2.2.8** - This section does not discuss the method(s) to be used to cut the 53 steel tanks. This should be included in the HASP. In either case, welding or cutting used containers is regulated in OSHA 29 CFR 1910.252(a)(3), and should be referenced in the HASP.

AWD RESPONSE A sentence will be added to 1.2.2.7, "Any hot work performed in tanks must be conducted in accordance with 29 CFR 1910.252 (a)(3) and Section 10.4, Hot Work, of this HSP".

H2 **Section 1.2.2.8, Page 1-6** - It is not stated how bulking of drum contents will be performed. Will there be compatibility testing? Will grounding and bonding be performed when liquid contents are transferred?

AWD RESPONSE Bulking of drum contens will not be performed during SPMR. The HASP will be changed to reflect this change in the scope of work.

H3 **Section 1.2.2.8, Page 1-7** - The spelling of "receptacle" is incorrect in this section.

AWD RESPONSE Corrected as noted.

H4 **Section 1.2.2.9, Page 1-7** - How will disposal of "miscellaneous debris" be accomplished? Will it be considered hazardous, special or general wastes?

AWD RESPONSE Please see response to Q14. The sentence in 1.2.2.9 will be amended as follows, "... will be disposed of in accordance with state regulations."

H5 **Section 1.2.2.10, Page 1-7** - How will potentially hazardous dusts be controlled?

AWD RESPONSE Please refer to Section 4.9 in the Environmental Control and Maintenance Plan. Also, please refer to the response to question H13.

H6 **Section 5.1.1, Page 5-2** - Methylene chloride is a suspected carcinogen and should be so noted on page 5-2.

AWD RESPONSE Section 5 has been revised. Please see the response to the H30.

H7 **Section 5.2.2, Page 5-4** - The third bullet in this section mentions that certain employees will be required to take breaks. What guidance will be used to determine the frequency and duration of breaks? There are NIOSH guidelines that apply to this activity that should be considered. The terms "periodic" and "duration" should be defined for the various temperatures and humidity that are likely to be encountered. As a practical matter, the SSO, PM, and SM will want to refer to easily referenced guidance in the HSP rather than through NIOSH guidance documents.

AWD RESPONSE Section 5.2.2, will have another bullet added. The bullet will state "Contractors will follow the NIOSH guidelines presented below to initially determine the frequency of physiological monitoring and work period duration.

ADJUSTED TEMPERATURE[B]	NORMAL WORK ENSEMBLE[C]	IMPERMEABLE ENSEMBLE
90°F(32.2°C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5° - 90°F (30.8° - 32.2°C)	After each 60 minutes of work	After each 30 minutes of work
82.5° - 87.5°F (28.1° - 30.8°C)	After each 90 minutes of work	After each 60 minutes of work
77.5° 0 82.5°F (25.3° - 28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5° - 77.5°F (22.5° - 25.3°C)	After each 150 minutes of work	After each 120 minutes of work

[A] For work levels of 250 kilocalories/hour.
[B] Calculate the adjusted air temperature (ta adj) by using this equation) ta adj °F + (12 x % sunshine). Measure air temperature (ta) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow. (100 percent sunshine = no cloud cover and a sharp, distinct shadow; 0 percent sunshine = no shadows.)
[C] A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.

H8 **Section 5.2.4, Page 5-5** - There should be some mention of site housekeeping, i.e., picking up loose material, boards, bricks, etc.

AWD RESPONSE A statement will be added that stresses housekeeping as a major control for slip, trip and fall hazards.

H9 **Section 5.4, Page 5-8** - Good job in acknowledging possible radioactive waste that may have been sent to the site.

AWD RESPONSE Thank you.

H10 **Section 7.1, Page 7-1** - It is recommended that the first sentence on this page be revised to state that the primary measure to limit exposure to personnel will be engineering controls and work design.

AWD RESPONSE The first sentence in Section 7.1 has been deleted and replaced with "The primary means of controlling personnel exposure will be engineering controls and work practices. However, when these types of controls are not feasible, personal protective equipment (PPE) will be used to ensure potential exposures are controlled to acceptable levels".

H11 **Section 7.2.2, Table 7-1, Page 7-4** - According to Table 7-1, it appears that Modified Level C does not include Tyvek/PE Coveralls, Rubber Boots/Boot Covers, Inner Surgical Gloves (Latex/Nitrile), Outer Gloves and Duct Tape All Joints as components of that level of protection. Understanding that Modified Level C is more protective than Level C alone, then all those components of Level C should be included in Modified Level C.

Also, what is the criteria for selection of Tyvek over PE coveralls? Each brand and type of coverall has been tested for permeability and degradation for an array of chemicals at various concentrations. This manufacturer-supplied information should be consulted when selecting either Tyvek or PE coveralls. Such a statement should be included in this section. Also, there are different types of PE coveralls. It is assumed that PE stands for Polyethylene and not a particular brand by the name of PE. PE should be identified. GMC-H is an MSA brand cartridge designation. Is everyone using MSA face masks (air purifying respirators)?

AWD RESPONSE Modified Level C, for this project, has been defined as air-purifying respirators and Level D dermal protection. This does not imply Modified Level C is more or less protective of Level C.

Please see the revised Table 7-1 for the response to the second half of the question.

TABLE 7-1
PERSONAL PROTECTIVE EQUIPMENT

PPE REQUIRED	LEVELS OF PROTECTION				
	D	Modified D	C	Modified C	B
Job Issue Cotton Coveralls	X	X	X	X	X
Eye Protection Meeting ANSI Z87.1	X	X			
Hard Hat	X	X	X	X	X
Steel Toe Boots	X	X	X	X	X
Chemically Protective Coveralls*		X	X		X
Rubber Boots/Boot Covers		X	X		X
Inner Surgical Gloves (Latex/Nitrile)		X	X		X
Outer Nitrile Gloves		X	X		X
Full Face Respirator with Combination Organic Vapor/HEPA Cartridges			X	X	
Self-Contained Breathing Apparatus					X
Duct Tape all Joints		X	X		X
As Needed					
Leather or Cotton Work Gloves	X	X	X	X	X
Hearing Protection	X	X	X	X	X

*The exact type of chemically protective coverall selected will be determined by the SSO based on manufacturer supplied information regarding permeability and degradation and the specific work task to be performed. In general, Tyvek coveralls are anticipated for activities which will not involve direct contact with liquids and Polyethylene-coated Tyvek are anticipated for those tasks which present a major splash hazard.

H12 **Section 8.2, Page 8-1** - The frequency of air samples is addressed in the last paragraph on this page. Sampling should be done when work activities change and when there are changes in work location.

AWD RESPONSE The following sentence has been added after the second sentence in the last paragraph of page 8-1. "Sampling shall also be conducted when work activities change or when the location of work changes if the SSO determines these changes could affect exposure."

H13 **Section 8.3, Page 8-2** - Will there be particulate sampling done? If potential contaminated dusts are to be made airborne, there should be an assessment of such a hazard.

AWD RESPONSE Please see new Section 8.3 and Table 8-1 below:

8.3 Real-Time Work Area Monitoring

Organic vapors, lower explosive limit/oxygen percentage, and particulates will be monitored in the work area throughout the project. The primary purpose of this monitoring is to provide immediate feedback to the SSO regarding potential exposures during intrusive activities, so that actions can be taken if necessary to reduce vapor releases in the work area. Monitoring data will be collected for these parameters throughout all intrusive site activities.

Real-Time Monitoring will include the following equipment. VOCs will be monitored using a Thermo Environmental Instruments, Inc. Model 580S PID with an 11.7 EV lamp or its performance equivalent. Lower explosive limits (LEL) and oxygen concentrations will be monitored using an MSA Model 261 LEL/0_2 meter or its performance equivalent. The LEL/O_2 meter is used to detect oxygen-deficient, oxygen-enriched, and combustible atmosphere. Particulates will be monitored with an M.I.E. Mini-Ram model PDM-3 or its performance equivalent. This instrument provides both real-time and integrated values corresponding to exposure to airborne particulates. The measurement range is from 0.01 through 100 mg/m^3.

All monitoring instruments will be calibrated daily in accordance with the manufacturer's recommendations.

Colorimetric detector tubes will be kept onsite by the Contractor. Tubes will correspond with the chemicals of concern for the Site. They will be utilized upon an indication of a PID reading of 1 ppm, for the purpose of qualitatively determining which chemical potential exposure exists and to determine what type of respiratory protection is appropriate.

A daily log will be kept at the site to record all monitoring data. The data will be summarized as part of a daily report, including parameter, instrument type, air concentration measured, time and location.

Table 8-1 provides the action levels to be utilized for this project.

TABLE 8-1 MONITORING INSTRUMENT ACTION LEVELS UNLESS OTHERWISE DIRECTED		
	AIR QUALITY MEASUREMENT	**RESPONSE**
I. Exclusion Zone Action Levels - Volatile Organic Vapors		
PID	0 - 5 ppm above background in breathing zone	Level D
PID	5 - 10 ppm above background in breathing zone	Level C
PID	Above 10 ppm above background in breathing zone	Level B
II. Action Level - Combustible Atmosphere		
CGI	Less than 10 percent LEL unknowns	Normal monitoring
CGI	Greater than 10 percent LEL unknowns	Continuous monitoring Check offsite impact
CGI	Greater than 20 percent LEL unknowns	Stop work
III. Action Level - Colorimetric Detector Tubes		
Specific Contaminant	1/2 to 1 x PEL	Level C
Specific	Greater than Applicable Exposure Limit	Consult with HSO to determine appropriate level of protection
IV. Action level - Real-Time Particulate		
Mini-Ram	0 - 1 mg/m^3 above background	Level D
Mini-Ram	1 mg/m^3 - 5 mg/m^3 above background	Level C
Mini-Ram	$>5mg/m^3$ above background	Stop work; consult HSO and institute dust control measures

H14 **Section 8.3, Table 8-1, Page 8-3** - What is the justification for setting the Action Level, when using Colorimetric Indicator Tubes, for Level C at a range up to 10 times the applicable exposure limit? For the chemical compounds identified in the Hazard Assessment (Section 5), NIOSH recommends the use of a self-contained breathing apparatus for exposures at any detectable concentration.

AWD RESPONSE Please see response to H13

H15 **Section 9.1.1, Page 9-1 (last paragraph)** - As discussed above, there should be some selection criteria for the use of poly-coated Tyvek or its performance equivalent.

AWD RESPONSE Please see AWD response to H11 and revised Table 7-1.

H16 **Section 9.1.2, Page 9-2** - Equipment should be scrubbed after an initial rinse regardless of how it appears.

AWD RESPONSE This change will be made as noted in Section 9.1.2.

H17 **Section 9.2.1, Page 9-3** - Detergent should be used for decontamination rather than soap.

AWD RESPONSE This change will be made as noted in Section 9.1.2.

H18 **Section 10** - Please include the installation of wind direction indicators such as telltale tapes or ribbons around the site.

AWD RESPONSE An additional bulleted item in Section 10.1 will be added stating that wind direction indicators such as visible tapes or ribbons will be installed around the site.

H19 **Section 10.1, Page 10-2 (third bullet)** - It appears that the word "drums" has been used in error.

AWD RESPONSE "Drums" has been changed to "drugs".

H20 **Section 10.1, Page 10-3 (last bullet)** - Should be revised to unconditionally prohibit smoking and eating in the EZ and CRZ.

AWD RESPONSE This bullet will be revised as specified above to unconditionally prohibit smoking and eating in the EZ and CRZ.

H21 **Section 10.3 (Confined Space/Limited Egress)** - This section should also include requirements for "Posting" such areas. We would like to see a blank Confined Space Entry Permit.

AWD RESPONSE Please see AWD response to H22.

H22 **Section 10.3, Page 10-9** - AWD should assure compliance with the new confined space rule promulgated by OSHA in January 1993. This section should make reference to that new rule and be consistent with it.

AWD RESPONSE The introductory paragraph for Section 10.3 has been deleted and replaced with the following; "All Contractors performing confined space entries must develop and implement a written program as required by 29 CFR 1910.146. At a minimum, the program shall comply with the requirements outlined in 29 CFR 1910.146(d), and the guidelines presented below."

H23 **Section 11.14** - This section discusses office trailer anchoring requirements. We would also include reference to office trailer electrical requirements found in Chapter 5, Article 550 of the National Electrical Code. Office trailers have significantly different wiring schemes from fixed buildings. Ground/neutral connections in the panel box are not common. Power supply cords, measured from the end of the cord to the face of the attachment plug must not be less than 21 feet nor longer than 361 1/2 feet. The face of the attachment plug to the point where the cord enters the trailer must not be less than 20 feet.

AWD RESPONSE Section 11.14 has been retitled as "Office Trailer Anchoring and Electrical System".

The section has also had a sentence added which states, "all electric services will be installed in compliance with National Electrical Code and local requirements."

H24 **Section 12.11, Table 12-1** - This table lists emergency alerting procedures. It does not include telephone numbers for the Project Manager and Corporate Health and Safety Manager. These people, it would appear, are already known to AWD and so are their telephone numbers. At least a central corporate number that could be used to reach them is need here. Although a remote potential, there is the possibility that an emergency patient will be contaminated. Have the hospital and ambulance services been made aware of this possibility?

AWD RESPONSE The actual contractor has not been selected, therefore the Project Manager and Corporate Health and Safety Manager are not currently known to AWD. Please see AWD response to S6. At the time of mobilization, initial phone calls will be made to local emergency response support organizations.

H25 **Section 12.12.1, Page 12-9** - For major injuries, it may not be recommended in all cases to spray down the victim. Preventing contamination from spreading by wrapping the victim with appropriate material is an alternative.

AWD RESPONSE See Section 12.15.1 Second bullet.

H26 **Section 14.4, Page 14-3 (Daily Information)** - The second set of bullets should include the time of calibration for each monitoring equipment used. This is relevant since temperatures and humidity sometimes fluctuate greatly from morning to mid-afternoon. Some monitoring equipment, such as the CGI/02 meter, will not read accurately from one set of meteorological conditions to the next.

AWD RESPONSE AWD agrees and will incorporate time of calibration.

H27 **Table V.1** - The PID response for tetrachloroethylene is stated to be 80% based on trichloroethylene. Will the PID be calibrated with trichloroethylene?

AWD RESPONSE The entry V.I. has been updated to reflect 53% response when the PID is calibrated with ispobutylene. The unit will be calibrated with 100 ppm isobutylene.

H28 **Appendices B, C, D, and E** - AWD indicated that the HASP Appendices will be completed on site by the HSS upon completion of mobilization. There are two comments regarding these Appendices. First, what is the HSS? The list of acronyms does not identify this title. Second, what is the reasoning behind deferring the inclusion of the information that needs to be included in these appendices until after the "completion of the mobilizing"? Without the information required for these appendices (PPE selection criteria, respiratory protection procedures, hazard communication and hearing

conservation), this HASP is not complete and therefore cannot be evaluated in its entirety. An RI/FS was completed at this site seven years prior to the preparation of this HASP. Certainly, knowing the identified hazards from that study and the activities planned for this project would allow for the preparation of these appendices before mobilization. In addition, Appendix C should require the use of nose cups in all respirators, including SCBAs and air line respirators, when temperatures are below 32°F. Also, on page two of this section, item 2 should be revised to read, "Only MSHA/NIOSH approved respiratory protective equipment....".

AWD RESPONSE All references to HSS will be changed to SSO. The written program "Appendix B, C, D, E," must be completed by contractor since OSHA requires that this program be provided by the employer.

H29 General - Are there any confined spaces that may be entered during this project? There is mention in Section 1.2.2.7 of this plan that tanks will be scanned internally with air monitoring equipment. Will this activity involve confined space entry? If so, or there is potential for it, there must be A SOP for confined space entry. If not, a statement should be included in the HASP prohibiting personnel from entering the tanks, or other confined space, during the project.

AWD RESPONSE Please see AWD Response to H22.

H30 General - Chemical Hazards identified in the Health and Safety Plan do not correspond with chemicals that will be monitored in the Air Monitoring Plan (see last comment in Air Monitoring Plan).

AWD RESPONSE Section 5.1 has been re-written as shown below and Section 5.1.1 has been deleted. Appendix A will include Tables for all compounds identified on Table 5-1 plus lead and cadmium.

5.1 Chemical Hazards

Previous site investigations have indicated the presence of a variety of chemicals including volatile organic compounds, base neutral/and extractable organics, metals and PCB's. The entire list of contaminants found during previous investigations can be reviewed in the Final Remedial Investigation Report which will be maintained on site as a reference.

Based on the previous investigations, the major contaminants of concern during the activities conducted in accordance with this HSP are listed in Table 5-1. This list of chemicals represents those contaminants found above acceptable soil concentrations as defined in the Consent Order.

These contaminants are generally classified as chlorinated solvents and aromatic hydrocarbons.

General health effects associated with over-exposure to chlorinated solvents include; narcosis, dermatitis, liver and kidney injury, skin and eye irritation and peripheral neuropathy. Many of these compounds are also considered to be carcinogens.

Aromatic hydrocarbons, in general, have pleasant odors and produce irritation to the mucous membranes upon overexposure. Other health effects associated with these compounds include narcosis and dermatitis. Fire and explosion hazards are considered a serious hazard with this class of compounds.

Appendix A illustrates the chemical, physical, and toxicological properties of the contaminants of concern listed on Table 5-1.

Because most of the contaminants detected onsite have relatively high vapor pressures, the primary exposure pathway during field activities will be via inhalation. However, a potential dermal contact exposure pathway will exist during remedial activities. The ingestion of contaminants is not likely if normal precautions concerning personal hygiene are followed.

In addition to the inhalation and dermal pathways, other exposure pathways are potential hazards to onsite personnel. Although they are less hazardous than the inhalation and dermal contact routes, precautions should be taken to avoid the following potential exposure pathways:

- Ingestion of contaminated subsurface or surface water
- Ingestion of contaminated surface soil
- Eye contact with any contaminated materials

To mitigate these potential hazards, a thorough program of personnel decontamination and hygiene will be maintained during remedial activities. Also, splash protection (e.g., goggles, rubber boot covers, and chemical resistant gloves) will be used during the sampling or handling of any contaminated liquids and during steam cleaning. Details on personal protective equipment and procedures are provided in Section 7.0 of this HSP. Specific steps for decontamination of equipment are included in Section 9.0.

TABLE 5-1
COMPOUNDS DETECTED IN THE SOIL AT CONCENTRATIONS
ABOVE THE ACCEPTABLE SOIL CONCENTRATIONS

COMPOUND	ACCEPTABLE SOIL CONCENTRATION (ug/kg)	MAXIMUM DETECTED CONCENTRATIONS (ug/kg)
VOLATILE ORGANICS (VOCs):		
Acetone	490	650,000
Chloroform	2,300	2,900
1,1-Dichloroethene	5.7	35,000
1,1-Dichloroethene	120	380
Ethylbenzene	234,000	1,500,000
Methylene Chloride	20	310,000
Methyl Ethyl Ketone	75	2,800,000
Methyl Isobutyl Ketone	8,900	190,000
Tetrachloroethene	130	650,000
Toluene	238,000	2,000,000
1,1,1-Trichloroethane	7,200	1,100,000
1,1,2-Trichloroethane	22	550
Trichloroethene	240	4,800,000
Total Xylenes	195,000	6,800,000
BASE NEUTRAL/ACID ORGANICS:	9,800	570,000

In addition to the organic compounds identified in Table 5-1, lead and cadmium have been identified at concentrations above typical soil levels.

While exposure to these metals is not anticipated to reach their established Permissible Exposure Limits (PEL's), they will be discussed in this HSP to provide on-site workers with appropriate information should site conditions change.

Lead is a potent systemic poison that can cause both acute and chronic health effects following exposure above its established PEL. The major acute effect associated with lead is known as lead encephalopthy. This condition can potentially lead to seizures, coma and death, following short-term exposures significantly above the OSHA PEL. Potential chronic health effects from long-term overexposure to lead include damage to the central and peripheral nervous systems, urinary system, reproductive system and blood-forming organs. Common systems of chronic overexposure include loss of appetite, anxiety, headache, dizziness, joint pain, and "wrist drop".

Cadmium is listed as an occupational carcinogen by NIOSH and may produce health effects via the inhalation or ingestion route of exposure. The target organs associated with cadmium include the respiratory system, kidneys, prostate and blood. Signs and systems of overexposure include pulmonary edema, chest tightness, substernal pain, chills, muscle aches, nausea and mild anemia.

Appendix A provides additional information concerning the chemical, physical, and toxicological properties of head and cadmium.